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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,966	03/31/2005	James Guillet	1047-025	6278

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EXAMINER	
LIGHTFOOT, ELENA TSOY	
ART UNIT	**PAPER NUMBER**
1715	

NOTIFICATION DATE	DELIVERY MODE
08/20/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/529,966	GUILLET ET AL.	
	Examiner	Art Unit	
	ELENA Tsoy LIGHTFOOT	1715	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 June 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,15-17,67-71,74-76 and 82-88* is/are pending in the application.

4a) Of the above claim(s) *1,15-17,67,68,70 and 83-88* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *69,71,74-76 and 82* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/29/10*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 29, 2010 has been entered.

Response to Amendment

Amendment filed on June 29, 2010 has been entered. Claim 72 has been cancelled. Claims 1, 15-17, 67-71, 74-76 and 82-88 are pending in the application. Claims 1, 15-17, 67-68, 70, 83-88 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention and species.

Claims examined on the merits are 69, 71, 74-76, and 82.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 69, 71, 74-76, and 82 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 69 recites "polymerizing at least one non-ionic hydrophobic substituent", which renders the claim indefinite because the "substituent" is a radical not a chemical compound. For

examining purposes the phrase was interpreted as "by polymerizing at least one non-ionic hydrophobic compound (or monomer)".

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Rejection of claims 69, 71, 74-76, and 82 under 35 U.S.C. 103(a) as being unpatentable over Blum (US 6,180,562) in view of Savignano et al (US 5,653,054), and further in view of Tanaka et al '930 has been withdrawn due to amendment.

5. Claims 69, 71, 74-76, and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blum (US 6,180,562) in view of Feil et al (Macromolecules 1993, 26, 2496-2500).

Blum is applied here for the same reasons as set forth in paragraph 8 of the Office Action mailed on 4/30/2010.

As to amendment, Blum teaches that heat is released over a temperature range because the polymers in the compositions exhibit a broad freezing transition range beginning at about 32^0F to about 27^0F or lower which enables the polymers to release their latent heat of fusion over a broad temperature range (See column 4, lines 21-30). It is also the Examiner's position that "32^0F to about 27^0F or lower" covers claimed "below 0^0C. It is well settled that overlapping ranges are prima facie evidence of obviousness. It would have been obvious to one having ordinary skill in the art to have selected the portion of Blum's range that corresponds to the claimed range.

Blum fails to teach that the polymer that is capable of releasing its latent heat of fusion over a range of dropping ambient temperature below 0^0C, is internally crosslinked polymer formed by polymerizing at least one non-ionic hydrophobic monomer, a cross-linker and non-ionic NIPAM (Claim 69).

Feil et al teaches that a thermosensitive (internally) *crosslinked* polymer (See page 2497, column 1, section "Results") formed by polymerizing (non-ionic) N-isopropylacrylamide (NIPAAm), butyl methacrylate (BMA, non-ionic hydrophobic monomer), and X (claimed cross-linker), with X being hydrophilic, hydrophobic, cationic, or anionic comonomers, is suitable for various phase separation applications at predetermined LCST temperature since its LCST can be controlled by varying monomer composition. In general, incorporation of *hydrophobic* comonomers leads to *lower* LCST and hydrophilic comonomers to a higher LCST. The presence of charge on the polymer also has a major effect on the LCST. (See page 2496, column 1, paragraphs 1-2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a crosslinked polymer formed by polymerizing (non-ionic) N-isopropylacrylamide, (non-ionic hydrophobic monomer) butyl methacrylate, and X, with X being hydrophilic, hydrophobic, cationic, or anionic comonomers, as a hydrogel polymer in Blum with the expectation of providing the desired phase transition temperature by varying monomer composition, as taught by Feil et al.

6. Claims 69, 71, 74-76, and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blum '562 in view of Savignano et al (US 5,653,054), and further in view of Feil.

Blum is applied here for the same reasons as in previous Office Actions.

As to solid particles of 1-1000 nm, Blum teaches that the composition further comprises *freezing point depressants*, such as monohydric alcohols, small chain dihydroxy and polyhydroxy alcohols, such as *propylene glycol* (See column 9, lines 20-26).

Blum does not disclose that the polymer is in the form of solid particles of internally crosslinked polymer formed by polymerizing (non-ionic) N-isopropylacrylamide, non-ionic hydrophobic monomer and a cross-linker, and having a molecular weight in the range of about 500,000 to about 50,000,000 (Claim 3) and diameter in the range of 1-1000 nm (Claims 2, 4, 6).

However, Blum teaches in the BACKGROUND OF THE INVENTION that a composition comprising a mixture of water, a water-soluble *freezing point depressant such as propylene glycol*, and a water dispersible thickening agent such as a crosslinked polyacrylic acid polymer was known to be used in the art for preventing or retarding frost formation on grass or leafy plants and described, for example by U.S. Pat. No. 5,653,054 to Savignano et al (See column 2, lines 8-20). Savignano et al '054 teaches that a suitable water dispersible thickening agent includes a **copolymer of *acrylamide* with acrylic acid ester** (claimed hydrophobic substituent), or preferably a crosslinked polyacrylic acid polymer (See column 3, lines 26-31) having a molecular weight in the range of about **750,000 to about 4,000,000** (See column 3, lines 15-18) prepared by polymerizing a mixture of acrylic acid and up to about 35 wt % of a copolymerizable monomer, e.g., an alkyl acrylate or methacrylate (claimed hydrophobic substituent), in the presence of a *crosslinking agent* having two or more CH_2=C< groups per molecule, e.g., *divinyl benzene* or butadiene (i.e. crosslinked *internally)* (See column 3, lines 18-25).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a **copolymer of *acrylamide* with acrylic acid ester** of Savignano et al in a composition of Blum in addition to freezing point depressant such as propylene glycol with the expectation of providing the desired preventing or retarding frost formation on grass or leafy plants since Blum does not limit its teaching to particular crosslinked polymers, and Savignano et al teaches that a copolymer of acrylamide with acrylic acid ester or crosslinked polyacrylic acid polymer together with freezing point depressant such as propylene glycol is suitable for the use in plant protecting compositions.

It is the Examiner's position that the crosslinked polymer of Savignano et al having M.W. of **750,000 to about 4,000,000** is *internally* crosslinked polymer comprising at least one hydrophobic substituent in the form of solid particles having diameter in the range of 1-1000 nm, as required by claims 2, 4, 6.

As to a crosslinked polymer comprising NIPAM, Blum fails to teach that the polymer that is capable of releasing its latent heat of fusion over a range of dropping ambient temperature below 0^0C, is internally crosslinked polymer formed by polymerizing at least one non-ionic hydrophobic monomer, a cross-linker and non-ionic NIPAM (Claim 1).

Feil et al teaches that a thermosensitive (internally) *crosslinked* polymer (See page 2497, column 1, section "Results") formed by polymerizing (non-ionic) N-isopropylacrylamide (NIPAAm), butyl methacrylate (BMA, non-ionic hydrophobic monomer), and X (claimed cross-linker), with X being hydrophilic, hydrophobic, cationic, or anionic comonomers, is suitable for various phase separation applications at predetermined LCST temperature since its LCST can be controlled by varying monomer composition. In general, incorporation of *hydrophobic*

comonomers leads to *lower* LCST and hydrophilic comonomers to a higher LCST. The presence of charge on the polymer also has a major effect on the LCST. (See page 2496, column 1, paragraphs 1-2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a crosslinked polymer formed by polymerizing (non-ionic) N-isopropylacrylamide, butyl methacrylate, and X, with X being hydrophilic, hydrophobic, cationic, or anionic comonomers, as a hydrogel polymer in Blum with the expectation of providing the desired phase transition temperature by varying monomer composition, as taught by Feil et al.

Response to Arguments

7. Applicant's arguments with respect to claims 69, 71, 74-76, and 82 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELENA Tsoy LIGHTFOOT whose telephone number is (571)272-1429. The examiner can normally be reached on Monday-Friday, 9:00AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Elena Tsoy Lightfoot, Ph.D.
Primary Examiner
Art Unit 1715

August 9, 2010

/Elena Tsoy Lightfoot/